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Original Research Article

Ramadan fasting during pregnancy: characteristics and outcomes

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ABSTRACT

Background: The primary aim of this study was to measure the prevalence of pregnant women who fast during Ramadan. The secondary outcome was their beliefs and motivations regarding fasting during Ramadan in addition to the consequences of fasting on maternal and neonatal outcome.

Methods: A retrospective review of pregnant patients aged between 18-45 years who presented for antenatal care in the private clinic in Beirut, Lebanon during or after the month of Ramadan between 2010 and 2019 was performed.

Results: A total of 502 pregnant patients were included in the study, of which 426 (84.9%) fasted during Ramadan and 76 (15.1%) did not fast at all. Of those who fasted, 148 (34.7%) fasted between 1 and 15 days while 278 (65.3%) fasted more than 15 days. Multiparous and non-Lebanese women had significantly higher rate of fasting compared to primiparous and Lebanese women. Adherence to fasting was associated with the spiritual environment that accompanies the month of Ramadan while non-adherence was mainly related to the fear from adverse effects on the mother and fetus. Fasting was not significantly associated with maternal complications or decreased neonatal birth weight.

Conclusions: The present study showed that Ramadan fasting is important to pregnant Muslim women. This was manifested by the relatively high rate of fasting even in summer and spring seasons. Understanding the beliefs and motivations of pregnant women would provide valuable insight to physicians to appropriately advise these women without compromising the maternal or fetal well-being.

Keywords: Ramadan, Pregnancy fast, Nutrition, Birth weight

INTRODUCTION

Fasting the month of Ramadan is one of the basic five pillars of Islam that is mentioned in the Holy Qur'an.¹ According to this obligation, Muslims restrain from eating and drinking from sunrise until sunset for one month (29-30 consecutive days), with a fasting period ranging from 11 to 20 hours each day. The timing of this month is based on the lunar calendar so the length of the days can vary from year to year and from a country to another depending on the latitude, longitude, and season.²

Although fasting in Ramadan is obligatory for all Muslims who are physically and mentally capable of doing so,

various groups are exempted such as menstruating women and women in the post-partum period. Also, the pregnant and breastfeeding woman is allowed not to fast if she fears that fasting would harm her own or the foetus health.² These women must make up every missed day of fasting when they are able.³

Despite the exemption, many pregnant women fast during Ramadan. This depends on several factors such as spiritual, social, age, level of education, and pregnancy trimester. Some pregnant women fast because of their belief that it is obligatory.¹ Others fast in order to share cultural and social experiences with their family.⁴ It was also reported that younger and less educated pregnant

women tend to fast more than older educated women.⁴ Moreover, women in the first trimester had higher adherence to fasting than those in the second or third trimester.⁵

Thus, fasting during pregnancy is considered debatable. Several studies examined the effect of fasting on pregnancy outcomes. On one hand, some studies concluded that pregnant women who fast during Ramadan are more likely to have foetal growth restrictions, poor pregnancy outcomes and give birth to premature or underweight babies due to the metabolic stress ensured by fasting.⁶ This in turn is associated with increased risk of cardiovascular diseases, diabetes, and impaired cognitive functions.⁷ Furthermore, the outcome might be affected by the timing of exposure to maternal fasting during Ramadan. Fasting during the first trimester has led to reduced birth weight whereas placental weight was lower when fasting occurred during second and third trimester.^{6,8} On the other hand, some studies showed that fasting in healthy women with appropriate nutrition has no adverse effect on intrauterine growth, preterm birth and birth weight.^{9,10} However, a number of studies could not reach consistent evidence pertaining the safety of Ramadan fasting in pregnancy and consider that the decision for fasting during pregnancy should be individualized.^{4,10,11}

Given the controversies and the inconclusive evidence regarding the pregnancy outcome in fasting Muslim women, we attempted to explore the characteristics of pregnant women and their relationship to Ramadan fasting as well as to demonstrate the effect of fasting on pregnant women. The primary outcome was the prevalence of pregnant women who fast during Ramadan. The secondary outcome was their beliefs and motivations regarding fasting during Ramadan in addition to the consequences of fasting on maternal and neonatal outcome.

METHODS

Study setting and population

A retrospective review of pregnant patients aged between 18-45 years who presented for antenatal care in the private clinic in Beirut, Lebanon during or after the month of Ramadan between 2010 and 2019 was performed.

Exclusion criteria were: pregnant women with history of systemic disorder; women who consumed drugs during pregnancy except for iron, folic acid, multivitamin and anxiolytic; pregnant with severe anemia (hematocrit-Hct 28 pre-pregnancy) or with anemia during the first trimester; woman who consumed alcohol; and presence of any fetal anomaly on morphoscan.

Data collection

Data collection was comprised of three sections. The first section consisted of demographic characteristics such as age, education, occupation, nationality, the number of

pregnancies, and stage of gestation at the time of fasting (first, second or third trimester). The second section was about the belief and awareness of participants regarding fasting in Ramadan. This included factors that influenced their decision whether to fast or not to fast and the duration of fasting. Patients were divided into two groups: non-fasting versus fasting. Those who fasted were classified into ≤ 15 days and >15 days. The third section was about the presence of any complication along with pregnancy and the mode of delivery.

Statistical analysis

Analysis was conducted using the Statistical Package for Social Sciences (SPSS version 24). Chi square test of Fisher's exact test were used for comparing categorical variables while t-test was used for comparing continuous ones. Categorical variables were presented as number and percent whereas continuous variables were presented as mean \pm standard deviation. A p value <0.05 indicated statistical significance.

RESULTS

A total of 502 pregnant patients were included in the study, of which 426 (84.9%) fasted during Ramadan and 76 (15.1%) did not fast at all. Of those who fasted, 148 (34.7%) fasted between 1 and 15 days while 278 (65.3%) fasted more than 15 days. Table 1 shows the demographic and maternal characteristics and their relationship to fasting. The mean age was similar between the two groups (24.54 ± 2.45 versus 25.23 ± 4.13 years in the non-fasting and fasting group respectively). Similarly, the rate of those who did not fast was similar to those who fasted among the different age categories. Among multiparous women, the percentage of those who fasted was significantly higher compared to those who did not fast (88.0% versus 12.0%, $p=0.03$). Moreover, 86.6% of housewives fasted while 13.4% did not. Regarding place of residency, all of those living in the village fasted compared to 84.4% of those living in the city. In addition, there was no significant difference with respect to education level and fasting although the rate of fasting was slightly higher in those who had elementary education level compared to high school and university levels. The percentage of Lebanese women who fasted was significantly lower (83.0%) compared to non-Lebanese (92.2%) ($p=0.02$).

As for the months during which Ramadan occurred, they were in five calendar months (from May to September). Hence, they were mostly in summer and few were in spring. Nevertheless, the rate of fasting did not significantly differ between the months or seasons. Most of the women fasted regardless of the season (Table 2).

Regarding motivation to fast, the majority (63.9%) wanted to benefit from the spiritual environment of Ramadan and to increase their spiritual activity. Only 3.4% felt guilty if they would not fast. On the other hand, most of those who did not fast or fasted for few days only were afraid that

fasting would negatively influence their foetus health (42.0%). Furthermore, 37.6% of the women thought that fasting will have adverse effects on their own health. Few women (1.2%) did not fast because their husbands told them not to (Table 3).

In terms of maternal complications, there were no significant differences between the fasting and non-fasting groups (Table 4). The most frequent complications occurring for both groups were headache followed by anaemia in the second trimester. Few patients experienced abdominal pain or false labour in both groups, nevertheless; symptoms were relieved with medical treatment. Concerning the incidence of early pregnancy loss and preterm deliveries, the rate was significantly higher in the non-fasting group (3.9%) compared to the

fasting group (0.5%) (p=0.03). There were no cases of foetal malformation.

As for mode of delivery, 72.4% of those who fasted delivered by normal vaginal delivery compared to 47.9% of those who did not fast while 27.6% of the fasting women delivered by cesarean section compared to 52.1% of the non-fasting women (p<0.0001).

As for neonatal weight, the mean weights were significantly higher in the non-fasting compared to the fasting group (3090.41±412.03 versus 3203.80±262.06 respectively, p=0.03). Similarly, the mean weight was significantly higher in those who fasted >15 days than those who fasted ≤15 days (3232.17±266.48 versus 3150.34±245.61, p=0.002) (Table 5).

Table 1: Demographic and maternal characteristics and their relationship to fasting.

Variable		Non-fasting (n=76)	Fasting (n=426)	Total	P value
Age (years)	Mean±SD	24.54±2.45	25.23±4.13	-	0.16
Age category	18-23	29 (17.0%)	142 (83.0%)	171	0.08
	24-34	47 (15.4%)	258 (84.6%)	305	
	35-45	0 (0.0%)	26 (100.0%)	26	
Parity	Primiparous	42 (19.2%)	177 (80.8%)	219	0.03
	Multiparous	34 (12.0%)	249 (88.0%)	283	
Job	Housewife	44 (13.4%)	284 (86.6%)	328	0.14
	Employed	32 (18.4%)	142 (81.6%)	174	
Place of residency	City	76 (15.6%)	411 (84.4%)	487	0.14
	Village	0 (0.0%)	15 (100.0%)	15	
Education level	Elementary level	1 (10.0%)	9 (90.0%)	10	0.11
	High school level	32 (12.2%)	231 (87.8%)	263	
	University or high education level	43 (18.8%)	186 (81.2%)	229	
Nationality	Lebanese	68 (17.0%)	331 (83.0%)	399	0.02
	Syrian or Palestinian	8 (7.8%)	95 (92.2%)	103	
BMI (kg/m²)	15-22	18 (17.0%)	88 (83.0%)	106	0.66
	22-35	47 (15.3%)	260 (84.7%)	307	
	>35	11 (12.4%)	78 (87.6%)	89	
Trimester during ramadan	First	5 (15.2%)	28 (84.8%)	33	1.00
	Second	41 (15.1%)	230 (84.9%)	271	
	Third	30 (15.2%)	168 (84.8%)	198	

Table 2: The rate of fasting between seasons.

Month/season	Non-fasting	Fasting	P value	Fasting ≤15 days	Fasting >15 days	P value
August-September (2010) (n=126)	22 (17.5%)	104 (82.5%)	0.22	39 (37.5%)	65 (62.5%)	0.78
August (2011) (n=55)	6 (10.9%)	49 (89.1%)		20 (40.8%)	29 (59.2%)	
July-August (2012, 2013) (n=81)	8 (9.9%)	73 (90.1%)		24 (32.9%)	49 (67.1%)	
June-July (2014-2016) (n=80)	18 (13.5%)	115 (86.5%)	0.08	38 (33.0%)	77 (67.0%)	0.52
May-June (2017, 2018, 2019) (n=72)	22 (20.6%)	85 (79.4%)		27 (31.8%)	58 (68.2%)	
Summer (2010-2016) (n=395)	54 (13.7%)	341 (86.3%)		121 (35.5%)	220 (64.5%)	
Spring (2017-2019) (n=107)	22 (20.6%)	85 (79.4%)		27 (31.8%)	58 (68.2%)	

Table 3: Factors that influence decision to fast or not to fast.

	Motivation	Number (%)
Motivation to fast	Feel guilty if not fasted	17 (3.4%)
	Benefit from spiritual environment of Ramadan	321 (63.9%)
	Increase spiritual activities	321 (63.9%)
Motivation not to fast or to fast few days	Afraid that fasting will affect baby's health	211 (42.0%)
	Afraid that fasting will affect maternal health	189 (37.6%)
	Husband said not to fast	6 (1.2%)

Table 4: Maternal complications during fasting.

Maternal complication	Non-fasting (n=76)	Fasting (n=426)	P value
Vomiting	15 (19.7%)	70 (16.4%)	0.48
Diarrhea	6 (7.9%)	36 (8.5%)	0.87
Headache	36 (47.4%)	220 (51.6%)	0.49
Hypertension	1 (1.3%)	5 (1.2%)	1.00
Hypotension	12 (15.8%)	54 (12.7%)	0.46
Hypoglycemia	4 (5.3%)	39 (9.2%)	0.26
Infection	11 (14.5%)	57 (13.4%)	0.80
Anaemia second trimester	47 (61.8%)	216 (50.7%)	0.07
Anaemia third trimester	2 (2.6%)	21 (4.9%)	0.55
Reduce fetal movement	4 (5.3%)	48 (11.3%)	0.11
Labor during second and third trimester	4 (5.3%)	7 (1.6%)	0.07
Early pregnancy loss during first trimester	3 (3.9%)	2 (0.5%)	0.03
Normal vaginal delivery	35 (47.9%)	307 (72.4%)	<0.0001
Cesarean section delivery	38 (52.1%)	117 (27.6%)	

Table 5: Mean neonatal weights and fasting duration.

Duration of fasting period	Mean birth weight (g)	P value
No fasting	3090.41±412.03	0.03
Fasting	3203.80±262.06	
≤15 days	3150.34±245.61	0.002
>15 days	3232.17±266.48	

DISCUSSION

In the present study, among pregnant women in Lebanon, 84.9% fasted at least one day during the month of Ramadan. Multiparous and non-Lebanese women had significantly higher rate of fasting compared to primiparous and Lebanese women. Adherence to fasting was associated with the spiritual environment that accompanies the month of Ramadan while non-adherence was mainly related to the fear from adverse effects on the mother and fetus. Fasting was not significantly associated with maternal complications or decreased neonatal birth weight.

To our knowledge, this is one of the first studies that examined the characteristics and outcomes of Ramadan fasting in pregnant women over a period of 10 years since most of the studies were conducted over one or few years.^{5,8,10-15}

The rate of fasting in the current study (84.9%) was similar to the rate of a study conducted in Pakistan (82.8%) and another in Indonesia (80%).^{5,13} Other studies showed a lower prevalence of fasting. A study in Erbil, Iraq, had a rate of 55%.¹⁴ Another study in Bradford, United Kingdom, had a rate of 43%.¹¹ Similarly, the prevalence of fasting was 53.9% in a study done in Netherlands and 43% in a German study.^{6,15} In the current study, of those who fasted, 65.3% fasted more than 15 days while the rate in Netherlands study was 37.7% and that of Iraq was around 85%.^{6,14} The rate of adherence to fasting could be reflected in how the women perceive the religious rule of fasting in pregnancy or how their healthcare providers failed to give them relevant information.

Several factors influence Ramadan fasting among pregnant women. Table 6 summarizes the outcome of studies that were conducted in different countries. The present study showed that multiparous women fasted

significantly more than primiparous. This is supported by other studies from Bradford and Singapore which concluded that fasting was associated with higher parity.^{11,16} However, the Netherlands and Indonesian studies reported that parity did not affect adherence to fasting.^{5,6} Moreover, the proportions of fasting women during pregnancy significantly differed across nationality in the current study since non-Lebanese (Syrians and Palestinians) fasted more than Lebanese (92.2% versus

83% respectively). Likewise, the findings in Netherlands showed that ethnicity affected fasting since the percentage of fasting was 78.9% in Moroccan, 21.7% in Turkish and 40% in other nationalities.⁶ In addition, the study in Bradford concluded that Bangladeshi nationals had higher odds of fasting than Indians and Pakistanis.¹¹ On the other hand, the study in Indonesia included different ethnic groups but this did not influence women's adherence to fasting.⁵

Table 6: Outcome of studies addressing Ramadan fasting during pregnancy.

Reference, country	Study design and sample size	Outcome measures	Results
Van Bilsen et al, 2016, Indonesia⁵	Cross sectional, 187 pregnant women	Factors that influence women's adherence to fasting	80% fasted at least 1 day. Adherence to fasting was associated with earlier gestational age and higher BMI. Non-adherence to fasting was related to opposition from husbands and to fear of adverse health effects on their own health or their fetus
Savitri et al, 2014, Netherlands	Prospective cohort, 130 pregnant women	Relationship between maternal adherence to Ramadan fasting, the trimester of pregnancy and the birth weight of newborns	53-8% fasted to some extent. Percentage of fasting mothers differed across ethnicities and trimesters of pregnancy and was slightly higher in the first trimester. Fasting may be associated with some reduction in the birth weight of newborns
Alwasel et al, 2010, Saudi Arabia⁸	Retrospective review, 7083 babies	Effect of maternal fasting on birth weight and placental size	Those who were in the second or third trimester during Ramadan had reduced mean placental weight and reduced ratio of placental weight to birth weight compared to babies who were not in utero during Ramadan. Occurrence of Ramadan was not associated with changes in birth weight
Ozturk et al, 2011, Turkey⁹	Prospective controlled study, 42 fasting and 30 non-fasting pregnant women	Effect of Ramadan fasting on maternal oxidative stress or fetal health	Maternal fasting during the second trimester does not have a significant effect on maternal oxidative stress, fetal development or birth weight
Awwad et al, 2012, Lebanon¹⁰	Prospective cohort study, 402 pregnant women, 201 fasted and 201 controls	Effect of Ramadan fasting on the rate of preterm delivery	Fasting does not seem to increase the risk of preterm delivery regardless of gestational age. Mean birth weight was lower and rate of ketosis and ketonuria was higher in the fasted women
Petheric et al, 2014, United Kingdom¹¹	Prospective cohort study, 310 pregnant women	Decision to fast or not during Ramadan. Secondary outcomes were preterm births and mean birth weight	43% reported fasting. Odds of fasting were higher for women with an obese BMI, for multiparous women and for different ethnicities. Odds of fasting were lower in women with higher levels of education and with increasing maternal age. No association was found between fasting and health outcomes in the offspring
Lou et al, 2015, USA¹²	Cross sectional, 37 women completed the survey	Women's attitudes concerning Ramadan fasting during pregnancy and determine how healthcare providers can better serve this population	30% fasted. Most women believed that fasting was harmful to themselves, their fetus, or both. Few women reported consulting others about fasting during pregnancy, with the most influential individuals being Muslim scholars, family and healthcare providers. The characteristics desired in a physician were being respectful of Islamic beliefs and having knowledge about Ramadan
Masood et al, 2018, Pakistan¹³	Cross sectional, 279 pregnant women	Pre-Ramadan health seeking behavior, fasting trends,	85.7% fasted 1 to 10 days. 72.4% did not consult any doctor for advice regarding fasting in pregnancy. Most women believed that fasting

Continued.

Reference, country	Study design and sample size	Outcome measures	Results
	who fasted during Ramadan	eating pattern and, sleep cycle	would not cause any harm to their fetus, while some family members feared about the health of mother and fetus. Women reported to have a reduced sleep cycle of about 3-4 hours. Food consumed at Suhur and Iftar were rich in fats and carbohydrates
Safari et al, 2019, Iraq ¹⁴	case-control study, 301 pregnant women	Fasting behaviors and perception of fasting during pregnancy, gestational diabetes, preterm labor, preeclampsia, low birth weight, Apgar score, height, weight, and head circumference of the newborn	51.5% fasted. Decision to fast was negatively associated with the mother's educational level and occupation. Women who did not fast during the second trimester of pregnancy were 1.51 times more likely to develop gestational diabetes. Most of the women who fasted perceived that fasting during pregnancy was compulsory. No association was found between fasting and preterm labor, preeclampsia, mode of delivery, and anthropometrics measurement of the newborns
Leimer et al, 2018, Germany ¹⁵	Cross sectional survey, 116 pregnant women	Information on Ramadan adherence and behavior	43% fasted for at least one day during their pregnancy. Women who fasted were significantly younger and less educated. There was no significant difference in terms of country of origin. Half of the women who fasted discussed their Ramadan behavior with their doctor. Very few reported being proactively approached by their doctor
Joosop et al, 2004, Singapore ¹⁶	Survey, 182 pregnant women	Factors that influence decision to fast and examines their knowledge, belief and attitudes on fasting	86.8% fasted. Women chose to fast during pregnancy, with support from their spouses and family. Most women did not experience any adversities during fasting and even if they did, most were able to overcome them. Most women adopt a positive attitude towards fasting. There is a lack of basic religious knowledge among many pregnant women pertaining to the Muslim rule of fasting during pregnancy
Sakar et al, 2015, Turkey ¹⁸	Prospective case-control, 106 pregnant women, 83 fasting and 83 non-fasting	Effect of fasting on fetal development and maternal-fetal Doppler indices	Fasting during pregnancy significantly impaired fetal development parameters such as biparietal diameter, head circumference, femur length and amniotic fluid index
Robinson et al, 2005, USA ¹⁹	Qualitative study, Focus groups, 32 women who were pregnant during Ramadan	Insight about their beliefs, attitudes, decision-making, and experiences in the healthcare system	87.5% fasted for some time. Most women preferred to fast if it would not harm them or their baby. They expressed autonomy about their decision-making and often did not discuss fasting with their healthcare providers. Many felt their providers were inadequately knowledgeable about the subject
Sarafraz et al, 2014, Iran ²⁰	Retrospective cohort, 293 pregnant women	Effect of fasting on neonatal birth weight	68.3% fasted. No significant association between maternal fasting and birth weight
Arab, 2004, Iran ²¹	Descriptive, 185 fasting pregnant women	Clinical symptoms and/ or calorie deficiency before Iftar (ending of the daily fast) can accurately predict ketonuria and hypoglycemia	Clinical symptoms and calorie intake were inappropriate for predicting ketonuria and hypoglycemia

Moreover, in the present study, age of the mothers, their education level, employment status as well as residency

(city or village) were not significantly associated with fasting. Likewise, the study in Indonesia showed that

neither age, education nor employment affected fasting during pregnancy.⁵ On the contrary, the studies by Leimer et al and Najimudeen concluded that younger women and those with low education level had a higher tendency to fast.^{2,15} The Bradford study reported that maternal employment was not significantly associated with fasting whereas women who had higher educational qualifications were less likely to fast as were older mothers compared to younger ones.¹¹ Safari et al noted in their study that maternal education and employment were significantly different between the fasting and non-fasting women; yet, similar to our study, residency whether urban (Erbil) or suburban, was not significantly associated with fasting.¹⁴ Regarding maternal body mass index (BMI) and trimester during fasting, our study did not show a significant relationship with fasting. Similarly, in the study by Awwad et al BMI and trimesters were not significantly correlated to maternal fasting.¹⁰ On the other hand, some studies showed that a higher pregnancy BMI predicted fasting. Additionally, higher adherence to fasting was among women who were in the first or second trimester as compared to the third trimester.^{5,6,11} This could be due to the lower burden of pregnancy during the first trimester of pregnancy or because women were still unaware about their pregnancy.¹⁷

The present study showed no significant difference in terms of maternal fasting and season or month since the proportion of those who fasted was similar in the spring and summer. The duration of fasting in Lebanon ranged from 12 hours and 40 minutes to 14 hours and 20 minutes during the study period. Most of the studies were conducted over a single season; hence, the seasonal effect could not be measured. Sakar et al conducted a study to assess the effect of Ramadan fasting on maternal and fetal outcomes in summer and concluded that fasting in the summer season may have some adverse effects since the fasting period during the summer months is longer than other seasons.¹⁸ The relatively high adherence to fasting in our study over both seasons could be attributed to the reason that most of the women were aware about the religious rule of fasting during pregnancy and that exemption would be in case of fear on mother's or fetal health.

Regarding the motivations that influence the mothers' decision whether to fast or not to fast, for those who fasted it was mostly that they wanted to benefit from the spiritual environment of Ramadan especially with their families and to increase their spiritual activity. For those who did not fast or fasted for few days, the majority was afraid that fasting will harm their health or their fetus health. These motivations were similar to those reported by Robinson et al and van Bilsen et al.^{5,19} However, unlike our study, in the latter study the husband's opinion about their wives fasting had a considerable consequence on maternal fasting.⁵

As for the maternal complications that occurred during fasting, there was no association between fasting and the

development of adverse events in our study. Early pregnancy loss in this study was related to factors other than fasting. Neonatal weight was also not associated with fasting or number of fasting days. Likewise, other studies did not find an association between fasting and adverse effects such as maternal oxidative stress, fetal development, fetal birth weight and preterm delivery.^{4,9,11,20} The study by Awwad et al showed that Ramadan fasting does not seem to increase the risk of preterm delivery but it increased some maternal complications such as ketosis, ketonuria, vomiting, diarrhea, and dizziness.¹⁰

Another study found that 61% of their pregnant participants had hypoglycemia and 31% had ketonuria before breaking their fast.²¹ Ketonuria and hypoglycemia frequently occur with prolonged fasting.²² Yet, in our study less than 10% of the women had hypoglycemia. This could be because most of the participating women were regularly monitoring their glucose level. Although association between fasting during Ramadan and birth weight have been examined in several studies; nevertheless, only few showed a significant effect of fasting on neonatal weight.⁶

A study reported that maternal fasting was associated with reduced placental weight at birth; however, birth weight was not affected.⁸ Sakar et al concluded that fasting during pregnancy significantly impaired fetal development parameters such as biparietal diameter, head circumference, femur length as well as amniotic fluid index.¹⁸

Given the possible risks that could be associated with fasting, many pregnant women seek the physician's opinion whether to fast or not to fast. The physician has to balance between the woman's wishes, her health and the fetus well-being. Hence, the decision of fasting should be individualized. Signs of maternal distress such as dehydration, ketonuria, tachycardia, weakness, nausea, vomiting and hypotension must make the women reconsider the decision to fast.^{19,23} In addition, signs of fetal compromise such as reduced fetal movement, intrauterine growth retardation, poor biophysical score, oligohydramnios, and abnormal color Doppler indices are indications for the necessity to terminate fasting.²³

Nevertheless, maintaining a balanced diet and a healthy lifestyle during pregnancy is necessary to sustain fasting and ensure fetal health.^{2,6} Adjustment of calorie intake with proper nutritional program is vital for fasting pregnant women.² Obstetricians must provide information and advice to pregnant women about how fast safely. This includes emphasizing on having suhur (before dawn) with drinking water and milk, eating dates as well as whole grains, high fiber, nuts, fruits, and vegetables. This will provide the necessary nutrients for the day. Moreover, avoiding excess sugar, salt, and caffeine along with eating balanced, nutritious iftar (evening meal) with plenty of fluids are important to have safe fasting. Avoiding

strenuous physical activity and getting adequate sleep would also help in having smooth fasting. Regular follow-up with the healthcare provider is necessary to assure appropriate fasting.¹⁹

CONCLUSION

The present study showed that Ramadan fasting is important to pregnant Muslim women. This was manifested by the relatively high rate of fasting even in summer and spring seasons. It also showed that fasting during pregnancy was not associated with maternal adverse events nor reduced fetal weight. The decision to fast during pregnancy is complex since it is influenced by medical, social, and religious factors. Understanding the beliefs and motivations of pregnant women would provide valuable insight to physicians to appropriately advise these women without compromising the maternal or fetal well-being.

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